REMARKS

Claims 1-19 are pending in the present application, and are rejected. Claim 1 is herein amended. No new matter has been entered.

Claim Rejections - 35 U.S.C. §103

Claims 1, 2, 4, 6, 8, 9, 12, 14 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Misium et al. (US Patent 6,261,973) in view of Wong (US Patent 5,423,944).

The Examiner asserts that it would have been obvious to combine the teachings of Misium and Wong because the "oxidizing agents such as nitric acid help remove defects" (as noted in Wong column 1 lines 20-25).

Claims 1, 3 and 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wong in view of Dobuzinsky et al. (US Patent 5,412,246).

The Examiner admits that Wong fails to disclose forming a second insulation film by low temperature processing, but that Dobuzinsky et al. does disclose low temperature plasma oxidation. The Examiner concludes that it would have been obvious to combine the teachings of Dobuzinsky et al. in view of Wong because the oxidizing agents such as nitric acid help remove defects (Wong column 1, lines 20-25) for the process of Dobuzinsky et al.

Claims 13 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wong in view of Dobuzinsky et al. as applied to claim 3 above, and further in view of Misium et al. The Examiner admits that Wong and Dobuzinsky et al. fail to teach the use of nitric acid and an ozone containing solution. The Examiner concludes that it would have been obvious to one of

ordinary skill to combine the teachings of Wong, Dobuzinsky et al. and Misium et al. because the oxidizing agents such as nitric acid help remove defects.

Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Misium et al. in view of Wong. The Examiner concludes that it would have been obvious to make an oxide film greater than one nanometer, because if the dielectric film were less than one nanometer it would lose its dielectric properties.

Claim 7 is rejected under 35 U.S.C. §103(a) as being unpatentable over Misium et al. in view of Wong as applied to claim 6 above, and further in view of the knowledge of one in the art. The Examiner concludes that it would have been obvious to heat the nitric acid solution above 70 °C, because it is known to heat the acid to facilitate easier removal of defects.

Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over Wong in view of Dobuzinsky et al. The Examiner asserts that since the Dobuzinsky et al. forms the nitride after the oxide is formed inherently there is a fixed period of time and the nitride is left for a fixed period (otherwise distinct layers of silicon oxide and silicon nitride would not have been formed as shown in figure 59.

Applicants herein amend claim 1 to clarify the invention. This amendment is supported by Figs. 1A and 1B and Figs. 3C and 3D. Thereafter, Applicants submit disagree with the rejections because not all of the claimed limitations are taught or suggested by the cited combination of references.

Applicants note that Figs. 1A and 1B indicate that a first insulation film 100 is formed on the surface of the semiconductor substrate 1 by cleaning the semiconductor substrate 1 with a strongly acidic solution, low-temperature processing is then performed, and the chemical insulation film is changed into a gate insulating film (second insulation film) 200 of the same material as the chemical insulation film.

Further, Applicants note that Figs. 3C and 3D indicate that a first insulation film 14 is formed on the surface of the semiconductor substrate 1 by cleaning the silicon (Si) semiconductor substrate 1 using a strongly acidic solution, low-temperature processing is then performed, and the chemical insulation film 14 is changed into a tunnel insulating film (second insulation film) 15a of the same material as the chemical insulation film 14.

Applicants note that the chemical insulation film 14 is made of a silicon oxide film which is formed by cleaning and oxidizing the semiconductor substrate 1 made of silicon (Si) with a strongly acidic solution, and the tunnel insulation film 15a is also made of a silicon oxide film as described in line 7 of page 12 of the present specification. Therefore, each of them is made of the same material.

The Examiner asserts that because Misium et al. discloses that a first insulation film is formed on the substrate and a second insulation film is further formed on the first insulation film by low-temperature processing, and because Wong discloses that an insulation film is formed on the surface of a substrate using an acidic solution, the combination of Misium et al. and Wong teach and suggest the present invention.

However, in Figs. 1A to 1C of Misium et al., a silicon dioxide layer 12 is formed on the wafer 10, and a nitride layer 22 made of a different material from the silicon dioxide layer 12 is formed on the silicon dioxide layer 12. Further, in Figs. 2A and 2B of Misium et al., a silicon dioxide layer 12 is formed on the wafer 10, and a nitride layer 22 made of a different material from the silicon dioxide layer 12 is formed on the silicon dioxide layer 12.

That is, in Misium et al., the nitride layer 22 corresponding to the second insulation film, which is made of a different material from the silicon dioxide layer 12, is formed on the silicon dioxide layer 12 corresponding to the first insulation film. Accordingly, even the combination of Misium and Wong does not teach all of the present invention wherein low-temperature processing is performed and the first insulation film is changed into the second insulation film of the same material as the first insulation film.

The Examiner also asserts that because Wong discloses that a first insulation film is formed on the surface of a substrate with use of a strong acid solution and Dobuzinsky et al. discloses that a second insulation film is formed by low-temperature processing, the combination of Wong and Dobuzinsky et al. teaches all of the present invention.

However, Applicants note that the combination in general, and Dobuzinsky et al. in particular, fail to teach that a silicon substrate 30 is cleaned when an oxide layer 39 shown in Fig. 5B corresponding to the second insulation film is formed. That is, in Dobuzinsky et al., it is never considered that a first insulation film is formed on a silicon substrate 30 by cleaning the silicon substrate 30. Even if Dobuzinsky et al. and the first insulation film of Wong are combined, the result is merely the formation of a second insulation film on the first insulation

film as indicated by the Examiner, which does not reach the present invention having the feature that low-temperature processing is performed and the first insulation film is changed into the second insulation film of the same material as the first insulation film.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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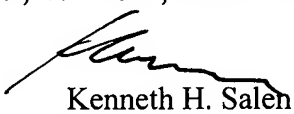

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